



DS 200

Electronic Pressure Switch

Stainless Steel Sensor

accuracy according to IEC 60770:
standard: 0.35 % FSO
option: 0.25 % FSO

Nominal pressure

from 0 ... 100 mbar up to 0 ... 600 bar

Contacts

1, 2 or 4 independent PNP contacts, freely configurable

Analogue output

2-wire: 4 ... 20 mA

3-wire: 4 ... 20 mA / 0 ... 10 V

others on request

Special characteristics

- ▶ indication of measured values on a 4-digit LED display
- ▶ rotatable and configurable display module

Optional versions

- ▶ **IS-version**
Ex ia = intrinsically safe for gases
- ▶ pressure sensor welded
- ▶ customer specific versions




The electronic pressure switch DS 200 is the successful combination of

- ▶ intelligent pressure switch
- ▶ digital display

and has been specially designed for numerous applications in various industrial sectors.

As standard the DS 200 offers a PNP contact and a rotatable display module with 4-digit LED display. Optional versions like e.g. an intrinsically safe version, max. 4 contacts and an analogue output complete the profile.

Preferred areas of use are

-  Plant and Machine Engineering
-  Heating and Air Conditioning
-  Environmental Engineering
(water – sewage – recycling)



Input pressure range												
Nominal pressure gauge ¹	[bar]	-1...0	0.10	0.16	0.25	0.40	0.60	1	1.6	2.5	4	6
Nominal pressure abs.	[bar]	-	-	-	-	0.40	0.60	1	1.6	2.5	4	6
Level gauge ¹	[mH ₂ O]	-	1	1.6	2.5	4	6	10	16	25	40	60
Overpressure	[bar]	5	0.5	1	1	2	5	5	10	10	20	40
Burst pressure ≥	[bar]	7.5	1.5	1.5	1.5	3	7.5	7.5	15	15	25	50

Nominal pressure gauge ¹ / abs.	[bar]	10	16	25	40	60	100	160	250	400	600
Level gauge ¹	[mH ₂ O]	100	160	250	400	600	-	-	-	-	-
Overpressure	[bar]	40	80	80	105	210	210	600	1000	1000	1000
Burst pressure ≥	[bar]	50	120	120	210	420	420	1000	1250	1250	1250
Vacuum resistance		P _N ≥ 1 bar: unlimited vacuum resistance; P _N < 1 bar: on request									
¹ from 60 bar: measurement starts with ambient pressure											

Contact ²	
Standard	1 PNP contact
Options	2 independent PNP contacts 4 independent PNP contacts (possible with M12x1, 8-pin for 4 ... 20 mA/3-wire; 0 ... 10 V/3-wire on request)
Max. switching current	4 ... 20 mA / 2- and 3-wire: contact rating 125 mA, short-circuit resistant; V _{switch} = V _S - 2V 0 ... 10 V / 3-wire: contact rating 125 mA, short-circuit resistant
Accuracy of contacts ³	standard: P _N < 0.4 bar: ≤ ± 0.5 % FSO P _N ≥ 0.4 bar: ≤ ± 0.35 % FSO option: P _N ≥ 0.4 bar: ≤ ± 0.25 % FSO
Repeatability	≤ ± 0.1 % FSO
Switching frequency	max. 10 Hz
Switching cycles	> 100 x 10 ⁶
Delay time	0 ... 100 sec

² max. 1 contact for 2-wire current signal with plug ISO 4400 as well as 2-wire current signal with IS-protection
no contact possible with 3-wire in combination with plug ISO 4400

Analogue output (optionally) / Supply	
2-wire current signal	4 ... 20 mA / V _S = 13 ... 36 V _{DC} permissible load: R _{max} = [(V _S - V _{Smin}) / 0.02 A] Ω response time: < 10 msec
2-wire current signal with IS-protection	4 ... 20 mA / V _S = 15 ... 28 V _{DC} permissible load: R _{max} = [(V _S - V _{Smin}) / 0.02 A] Ω response time: < 10 msec
3-wire current signal	4 ... 20 mA / V _S = 19 ... 30 V _{DC} adjustable (turn-down of span 1:5) ⁴ permissible load: R _{max} = 500 Ω response time: < 3 sec
3-wire voltage signal without analogue output	0 ... 10 V / V _S = 15 ... 36 V _{DC} permissible load: R _{min} = 10 kΩ response time: < 3 msec
Accuracy ³	standard: P _N < 0.4 bar: ≤ ± 0.5 % FSO; P _N ≥ 0.4 bar: ≤ ± 0.35 % FSO option: P _N ≥ 0.4 bar: ≤ ± 0.25 % FSO

³ accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)

⁴ with turn-down of span the analogue signal is adjusted automatically to the new measuring range

Thermal effects (Offset and Span)				
Nominal pressure P _N	[bar]	-1 ... 0	< 0.40	≥ 0.40
Tolerance band	[% FSO]	≤ ± 0.75	≤ ± 1	≤ ± 0.75
in compensated range	[°C]	-20 ... 85	0 ... 70	-20 ... 85

Permissible temperatures			
Permissible temperatures	medium: -40 ... 125 °C	electronics / environment: -40 ... 85 °C	storage: -40 ... 100 °C

Electrical protection	
Short-circuit protection	permanent
Reverse polarity protection	no damage, but also no function
Electromagnetic compatibility	emission and immunity according to EN 61326

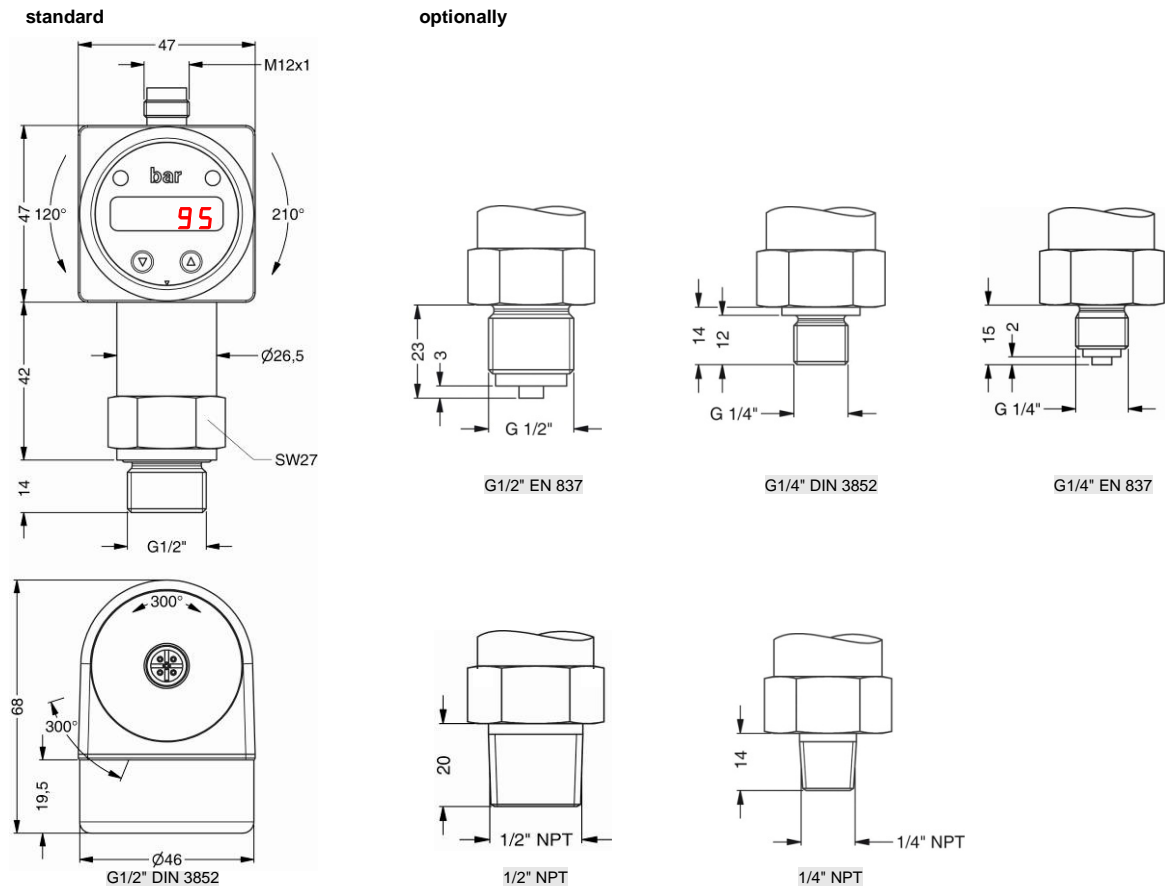
Mechanical stability	
Vibration	10 g RMS (25 ... 2000 Hz) according to DIN EN 60068-2-6
Shock	500 g / 1 msec according to DIN EN 60068-2-27

Materials	
Pressure port	stainless steel 1.4404 (316 L)
Housing	stainless steel 1.4404 (316 L)
Display housing	PA 6.6, polycarbonate
Seals (media wetted)	standard: FKM option: welded version ⁵ others on request
Diaphragm	stainless steel 1.4435 (316 L)
Media wetted parts	pressure port, seals, diaphragm

⁵ welded version only for pressure ports according to EN 837; possible for nominal pressure ranges P_N ≤ 40 bar

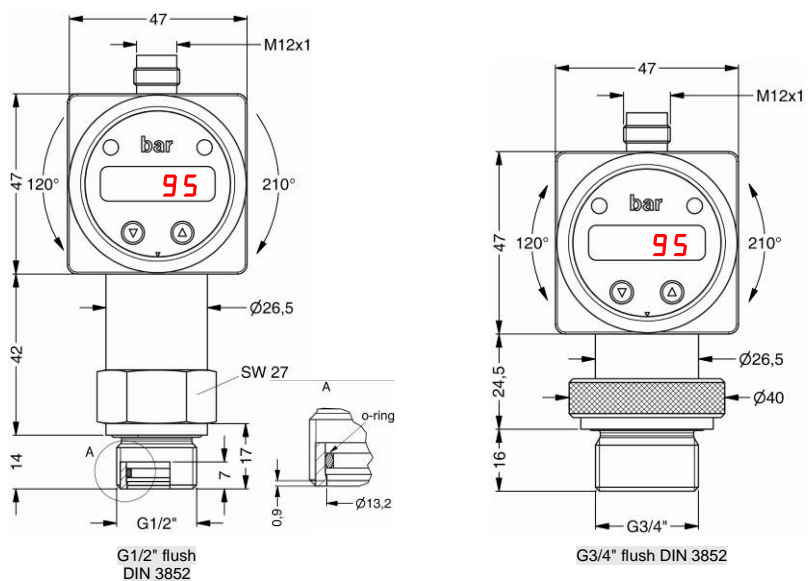
Explosion protection (only for 4 ... 20 mA / 2-wire)						
Approval AX14-DS 200	IBExU 06 ATEX 1050 X zone 1: II 2G Ex ia IIC T4 Gb (connector) / II 2G Ex ia IIB T4 Gb (cable)					
Safety technical maximum values	$U_i = 28 \text{ V}$, $I_i = 93 \text{ mA}$, $P_i = 660 \text{ mW}$, $C \approx 0 \text{ nF}$, $L_i \approx 0 \text{ }\mu\text{H}$					
Max. switching current ⁶	70 mA					
Permissible temperatures for environment	-25 ... 70 °C					
Connecting cables (by factory)	cable capacitance: signal line/shield also signal line/signal line: 100 pF/m cable inductance: signal line/shield also signal line/signal line: 1 $\mu\text{H}/\text{m}$					
⁶ the real switching current in the application depends on the power supply unit						
Miscellaneous						
Display	4-digit, red 7-segment-LED display, digit height 7 mm, range of indication -1999 ... +9999; accuracy 0.1 % \pm 1 digit; digital damping 0.3 ... 30 sec (programmable); measured value update 0.0 ... 10 sec (programmable)					
Current consumption (without contacts)	2-wire signal output current: max. 25 mA 3-wire signal output current: approx. 45 mA + signal current 3-wire signal output voltage: approx. 45 mA					
Ingress protection	IP 65					
Installation position	any ⁷					
Weight	min. 160 g (depending on mechanical connection)					
Operational life	$> 100 \times 10^6$ cycles					
CE-conformity	EMC Directive: 2014/30/EU			Pressure Equipment Directive: 2014/68/EU (module A) ⁸		
ATEX Directive	2014/34/EU					
⁷ Pressure switches are calibrated in a vertical position with the pressure connection down. If this position is changed on installation there can be slight deviation in the zero point for pressure ranges $P_N \leq 1 \text{ bar}$.						
⁸ This directive is only valid for devices with maximum permissible overpressure $> 200 \text{ bar}$						
Wiring diagrams						
<p>2-wire-system (current)</p>			<p>3-wire-system (current / voltage)</p>			
Pin configuration						
Electrical connection	M12x1 plastic (5-pin)	M12x1 metal (5-pin)	M12x1 plastic (8-pin)	ISO 4400	Binder series 723 (5-pin)	cable colours (IEC 60757)
Supply +	1	1	1	1	1	wh (white)
Supply -	3	3	3	2	3	bn (brown)
Signal + (only 3-wire)	2	2	2	3	2	gn (green)
Contact 1	4	4	4	3	4	gy (grey)
Contact 2	5	5	5	-	5	pk (pink)
Contact 3	-	-	6	-	-	bu (blue)
Contact 4	-	-	7	-	-	rd (red)
Shield	via pressure port	plug housing/ pressure port	via pressure port	ground contact	plug housing/ pressure port	gnye (green-yellow)
Electrical connections (dimensions in mm)						
					<p>cable outlet PVC $\varnothing = 4.9 \text{ mm}$ cable outlet PUR $\varnothing = 5.7 \text{ mm}$</p>	
M12x1 (5-pin)	M12x1 (8-pin)	ISO 4400	Binder series 723 (5-pin)	cable outlet ⁹		
⁹ different cable types and lengths available; standard: 2 m PVC cable (without ventilation tube, permissible temperature: -5 ... 70 °C)						

Mechanical connections (dimensions in mm)



⇒ for nominal pressure $P_N > 400$ bar increases the length of devices without IS-version by 19 mm and of devices with IS-version by 39 mm

optionally for P_N from 0.1 up to 40 bar



⇒ metric threads and other versions on request

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Ordering code DS 200

DS 200

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Pressure																					
	gauge in bar	¹	7	8	0																
	gauge in mH ₂ O	¹	7	8	H																
	absolute in bar	²	7	8	1																
Input		[mH ₂ O]	[bar]																		
	1	0.10	²	1	0	0	0														
	1.6	0.16	²	1	6	0	0														
	2.5	0.25	²	2	5	0	0														
	4	0.40		4	0	0	0														
	6	0.60		6	0	0	0														
	10	1.0		1	0	0	1														
	16	1.6		1	6	0	1														
	25	2.5		2	5	0	1														
	40	4.0		4	0	0	1														
	60	6.0		6	0	0	1														
	100	10		1	0	0	2														
	160	16		1	6	0	2														
	250	25		2	5	0	2														
	400	40		4	0	0	2														
	600	60		6	0	0	2														
	100			1	0	0	3														
	160			1	6	0	3														
	250			2	5	0	3														
	400			4	0	0	3														
	600			6	0	0	3														
	-1 ... 0			X	1	0	2														
	customer			9	9	9	9														consult
Analogue output																					
	without						0														
	4 ... 20 mA / 2-wire						1														
	0 ... 10 V / 3-wire						3														
	4 ... 20 mA / 3-wire, adjustable						7J														
	Intrinsic safety 4 ... 20 mA / 2-wire						E														
	customer						9														consult
Contact																					
	1 contact	^{3,4}					1														
	2 contacts	^{3,4}					2														
	4 contacts	⁵					4														
Accuracy																					
	standard for P _N > 0,4 bar		0.35 %				3														
	standard for P _N ≤ 0,4 bar		0.5 %				5														
	option for P _N ≥ 0,4 bar		0.25 %				2														
	customer						9														consult
Electrical connection																					
	Male plug M12x1 (5-pin) / plastic version						N	0	1												
	Male plug M12x1 (8-pin) / plastic version	⁵					M	5	0												
	Male plug M12x1 (5-pin) / metal version						N	1	1												
	Male and female plug ISO 4400	⁴					1	0	0												
	Male plug Binder series 723 (5-pin)						2	0	4												
	Cable outlet incl. cable	⁶					T	A	0												
	customer						9	9	9												consult
Mechanical connection																					
	G1/2" DIN 3852						1	0	0												
	G1/2" EN 837						2	0	0												
	G1/4" DIN 3852						3	0	0												
	G1/4" EN 837						4	0	0												
	G1/2" DIN 3852 with flush sensor	⁷					F	0	0												
	G3/4" DIN 3852 with flush sensor	⁷					K	0	0												
	1/2" NPT						N	0	0												
	1/4" NPT						N	4	0												
	customer						9	9	9												consult
Seals																					
	FKM						1														
	without (welded version)	⁸					2														
	customer						9														consult
Special version																					
	standard						0	0	0												
	customer						9	9	9												consult

¹ from 60 bar: measurement starts with ambient pressure
² absolute pressure possible from 0.4 bar
³ with Ex version max. 1 contact is possible
⁴ with connector ISO 4400 and output 2-wire version only max. 1 contact possible; with 3-wire version no contact possible
⁵ 4 contacts and M12x1, 8-pin only possible in combination and together with 4 ... 20 mA/3-wire; 0 ... 10 V/3-wire on request
⁶ standard: 2 m PVC cable without ventilation tube, others on request
⁷ not possible for nominal pressure P_N > 40 bar; for G3/4" flush nominal pressure abs. on request
⁸ welded version only with pressure ports according to EN 837; possible for nominal pressure ranges P_N ≤ 40 bar

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